KIPS ONLINE EARLY PREP SESSION

BY SAEED MDCAT

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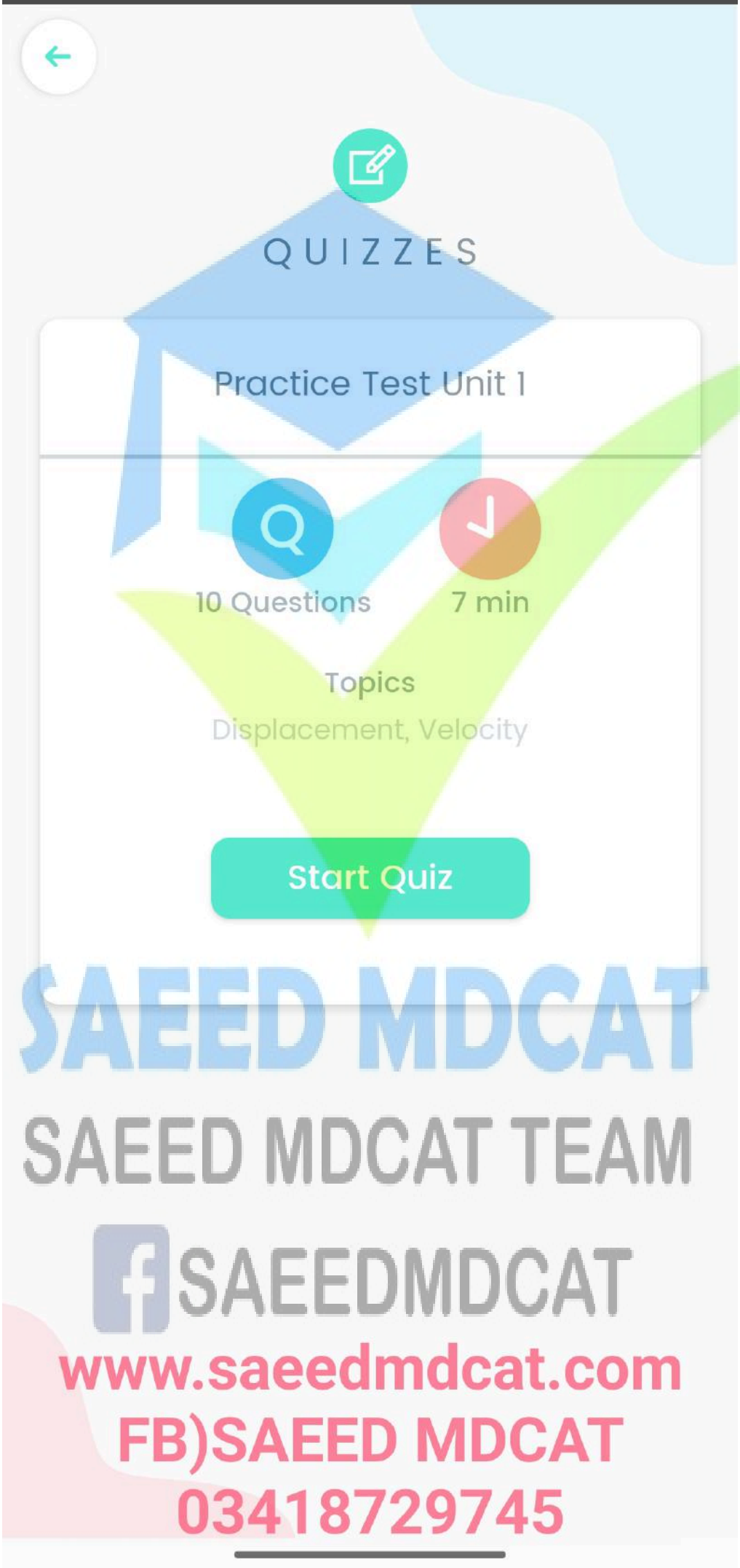
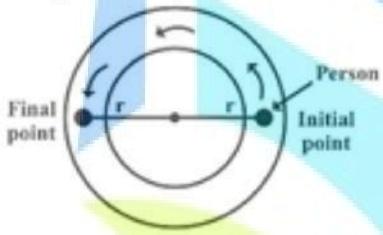


06 : 52

Q 1/10 7 min Hint

Q :
A person moves along a circular track and covers half of the path as shown in figure. What will be the ratio of its distance to displacement covered?



A 2r

B 4r

C $\frac{r}{2}$

D $\frac{\pi}{2}$

06 : 45

Q 2/10 7 min Hint

Q :
An athlete completes one round of a circular track of radius R in 40 sec. What will be his displacement at the end of 3 min. 20 sec?

A Zero

B $2\pi R$

C 2R

D $7\pi R$

1 2 3 4 5 6 7

06 : 43

Q 3/10 7 min Hint

Q :
A man leaves his house for a cycle ride. He comes back to his house after half-an-hour after covering a distance of one km. What is his average velocity for the ride?

A zero

B 2 km/h

C 10 km/h

D 1/2 km/h

1 2 3 4 5 6 7

06 : 41

Q 4/10 7 min Hint

Q :
Stopping distance of a moving vehicle is directly proportional to

A square of the initial velocity

B square of the initial acceleration

C the initial velocity

D the initial acceleration

1 2 3 4 5 6 7

06 : 39

Q 5/10 7 min Hint

Q :
The ratio of displacement along diameter and total distance along circle:

A $1 : \pi$

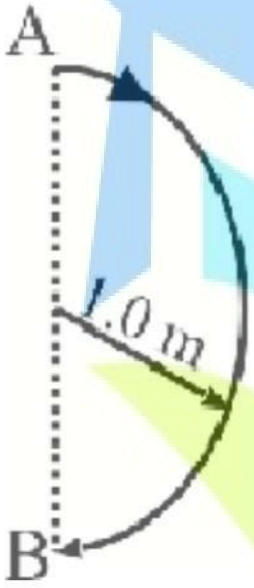
B $2 : \pi$

C $\pi : 1$

D $\pi : 2$

06 : 35

Q :
In 1.0 second a particle goes from point A to point B moving in a semi-circle a radius 1.0 m (figure). The magnitude of the average velocity is



A 3-14 m/s

B 2.0 m/s

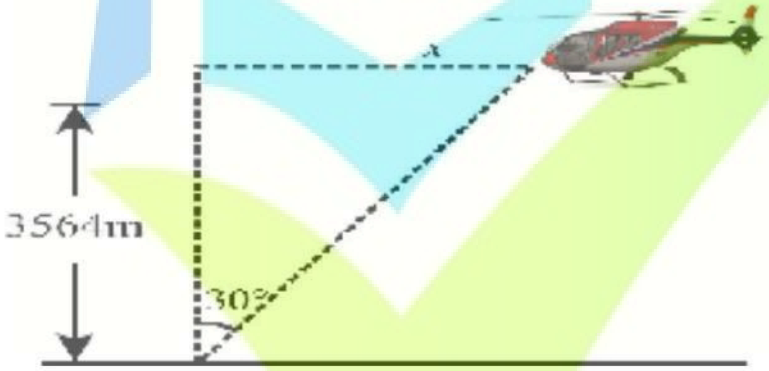
C 1/0 m/s

D zero

06 : 01

Q 7/10 7 min Hint

Q :
A helicopter is flying at 3564 m above ground. If an angle of 30° is subtended at a ground point by the helicopter position 100s apart, what is the speed of the helicopter



A 100 ms-1

B 150 ms-1

C 20 ms-1

D 25 ms-1

1 2 3 4 5 6 7

05 : 57

Q 8/10 7 min Hint

Q :
A car travels equal distance in the same direction with velocities 60 km h−1, 20 km h−1 and 10 km h−1 respectively. The average velocity of the car over the whole journey of motion is

A 8 ms-1

B 6 ms-1

C 7 ms-1

D 5 ms-1

3 4 5 6 7 8 9

05 : 54

Q 9/10 7 min Hint

Q :

Two bodies are moving in opposite directions with velocity v. The relative velocity of one with respect to the other is

A $\sqrt{2}v$

B $2v$

C v

D Zero

3 4 5 6 7 8 9

05 : 53

Q 9/10 7 min Hint

Q :

Two bodies are moving in opposite directions with velocity v. The relative velocity of one with respect to the other is

A $\sqrt{2}v$

B $2v$

C v

D Zero

3 4 5 6 7 8 9

05 : 43

Q 10/10 7 min Hint

Q :
A moves with 65 km/h while B is coming back of A with 80 km/h. The relative velocity of B with respect to A is

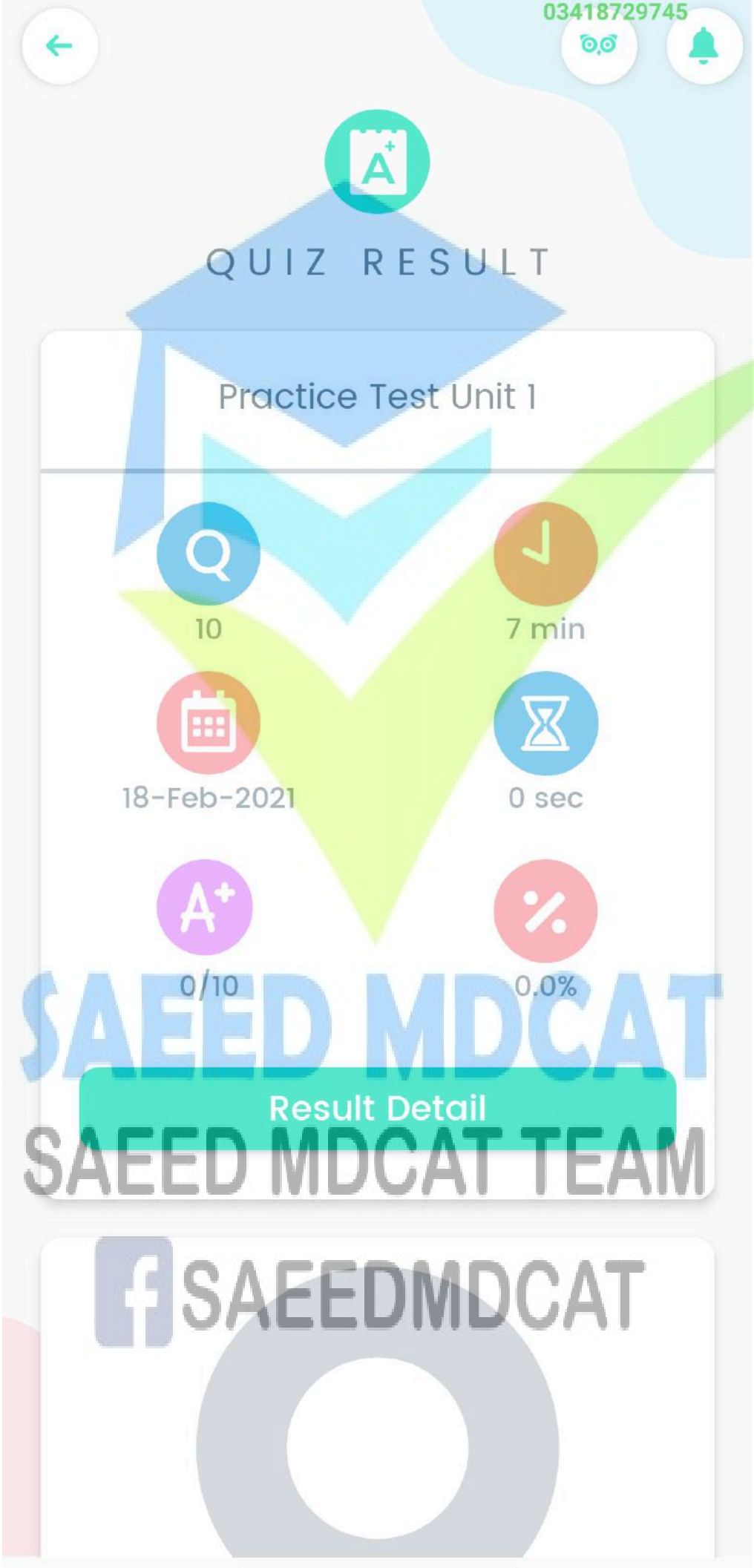
A 80 km/h

B 60 km/h

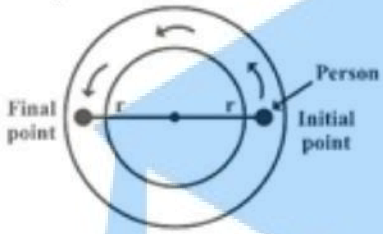
C 15 km/h

D 145 km/h

4 5 6 7 8 9 10



A person moves along a circular track and covers half of the path as shown in figure. What will be the ratio of its distance to displacement covered?



A) 2r

B) 4r

C) $\frac{r}{2}$

D) $\frac{\pi}{2}$

Explanation

$$\frac{S}{|\vec{d}|} = \frac{r\theta}{2r} = \frac{\pi}{2}$$

Q :
An athlete completes one round of a circular track of radius R in 40 sec. What will be his displacement at the end of 3 min. 20 sec?

A Zero

B $2\pi R$

C 2R

D $7\pi R$

Explanation

Total time of motion is 3 min 20 sec = 20 sec. As time period of circular motion is 40 sec so in 20 sec athlete will complete 5 revolution i.e., he will be at starting point i.e., displacement = zero.

Correct Unattempted

Incorrect 3/10

Q :
A man leaves his house for a cycle ride. He comes back to his house after half-an-hour after covering a distance of one km. What is his average velocity for the ride?

A zero

B 2 km/h

C 10 km/h

D 1/2 km/h

Explanation

Since displacement is zero.

Q :
Stopping distance of a moving vehicle is directly proportional to

A square of the initial velocity

B square of the initial acceleration

C the initial velocity

D the initial acceleration

Explanation

Let s be the distance travelled by the vehicle before it stops. Final velocity
v=0
, initial velocity = u Using equation of motion
v2− u2= 2aS
02− u2= 2aS
Stopping distance,
S =−u2/2a

Q :
The ratio of displacement along diameter and total distance along circle:

A $1 : \pi$

B $2 : \pi$

C $\pi : 1$

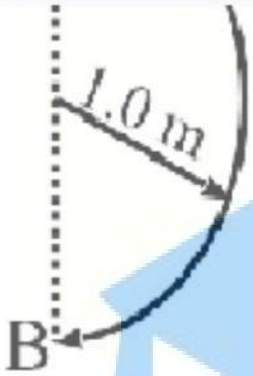
D $\pi : 2$

Explanation

$|\vec{d}| = 2r$ (along diameter)

$S = 2\pi r$ (distance along circle)

$$\frac{|\vec{d}|}{S} = \frac{2r}{2\pi r} = 1 : \pi$$



A 3-14 m/s

B 2.0 m/s

C 1/0 m/s

D zero

Explanation

$d = 2r = 2(1) = 2$

$$v_{ave} = \frac{\Delta d}{\Delta t} = \frac{2}{1} = 2ms^{-1}$$

A 100 ms-1

B 150 ms-1

C 20 ms-1

D 25 ms-1

Explanation

Here tan 30°=x/3564

$x = 3564 \times \frac{1}{\sqrt{3}} = 2000\,m$

Speed of the helicopter $= \frac{2000}{100} = 20\,ms^{-1}$

Q :
A car travels equal distance in the same direction with velocities 60 km h−1, 20 km h−1 and 10 km h−1 respectively. The average velocity of the car over the whole journey of motion is

A 8 ms-1

B 6 ms-1

C 7 ms-1

D 5 ms-1

Explanation

Average velocity

$$= \frac{3x}{\frac{x}{60} + \frac{x}{20} + \frac{x}{10}} = \frac{3x}{\frac{x + 3x + 6x}{60}} = \frac{3x \times 60}{10x} = 18$$

Q :
A car travels equal distance in the same direction with velocities 60 km h−1, 20 km h−1 and 10 km h−1 respectively. The average velocity of the car over the whole journey of motion is

A 8 ms-1

B 6 ms-1

C 7 ms-1

D 5 ms-1

Explanation

$$= \frac{3x}{\frac{x+3x+6x}{60}} = \frac{3x \times 60}{10x} = 18 km\ h^{-1} = 5\ ms^{-1}$$

Two bodies are moving in opposite directions with velocity v. The relative velocity of one with respect to the other is

A $\sqrt{2}v$

B $2v$

C v

D Zero

Explanation

$$v_{rel} = \sqrt{v_1^2 + v_2^2 - 2v_1 v_2 \cos\theta}$$

$$v_{rel} = \sqrt{v^2 + v^2 - 2v^2 \cos 180°}$$

$$V_{rel} = \sqrt{v^2 + v^2 - 2v^2} = \sqrt{4v^2} = 2v$$

Incorrect

Q 10/10

Q :
A moves with 65 km/h while B is coming back of A with 80 km/h. The relative velocity of B with respect to A is

A 80 km/h

B 60 km/h

C 15 km/h

D 145 km/h

Explanation

vB+vA= v B+vA=80+65=145 km/hr

QUIZZES

Practice test 2 unit 1

10 Questions

10 min

Topics

Acceleration, Graphical representation of acceleration with velocity time graph

Start Quiz

09 : 57

Q 1/10 10 min Hint

Q :
A constant force F changes the velocity of a 80kg sprinter from 3ms-1 to 4ms-1 in 0.5 sec. The acceleration of sprinter will be

A 1.5ms-2

B 2.5 ms-2

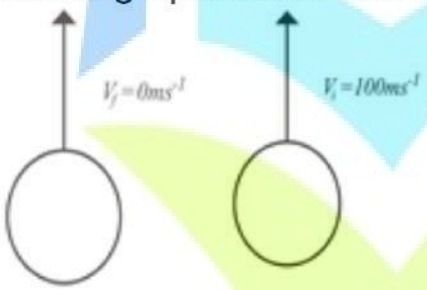
C 2.0 ms^{-2}

D 3.0 ms-2

09 : 55

Q 2/10 10 min Hint

Q : A ball is projected upwards with an initial velocity $V_i = 100\,ms^{-1}$ as shown in the figure. It comes back after sometime and strikes ground with the same velocity but pointing downward. What is the angle between acceleration when moving upward to acceleration coming down?



A 180°

B 90°

C 60°

D 0°

09 : 53

Q 3/10 10 min Hint

Q :
A baseball is thrown vertically into the air. The acceleration of the ball at its highest point is:

A Zero

B g, up

C g, down

D 2g, down

1 2 3 4 5 6 7

09 : 51

Q 4/10 10 min Hint

Q :

A passenger in a moving train tosses a coin. If the coin falls behind him, the train must be moving with

A An acceleration

B a deceleration

C A uniform speed

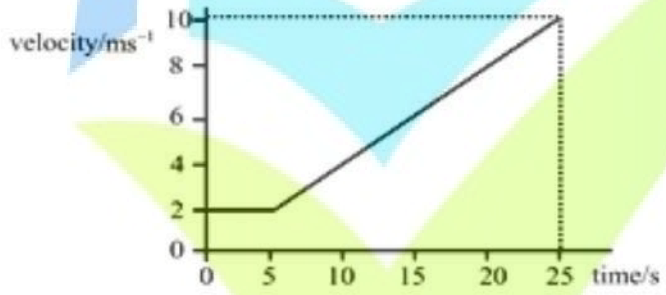
D any of the above

09 : 49

Q 5/10 10 min Hint

Q :

The diagram shows a velocity-time graph for a particle moving along a straight line. What is the displacement of the particle between 0 s and 25 s?



A 90 m

B 130 m

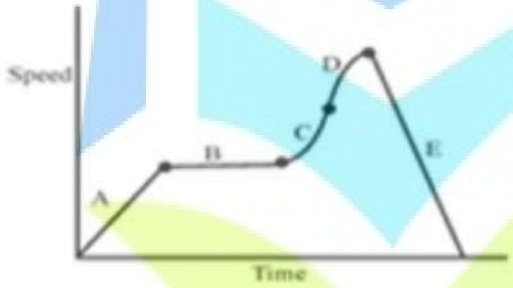
C 120

D 150 m

09 : 47

Q 6/10 10 min Hint

Q : The graph shows how the speed of an object changes with time. Which section of the graph shows the object moving with an increasing acceleration?



A A

B B

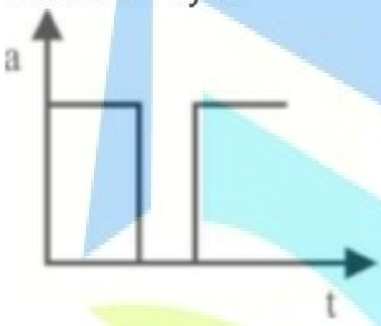
C C

D D

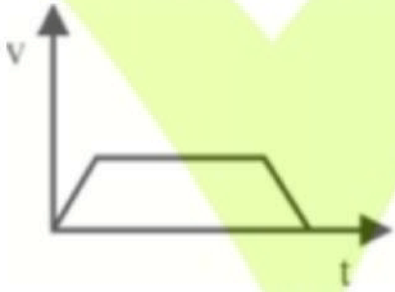
09 : 39

Q 7/10 10 min Hint

Q : Acceleration-time graph of a body is shown. The Corresponding velocity time graph of the same body is



A



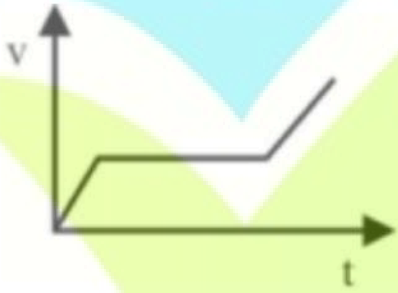
B

C

09 : 36

A

B



C

D

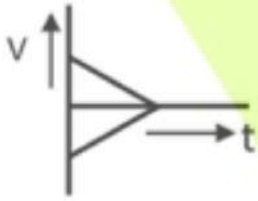
09 : 30

Q 8/10 10 min Hint

Q : Displacement time graph of a ball thrown vertically upward is shown in figure then its v-t graph is:

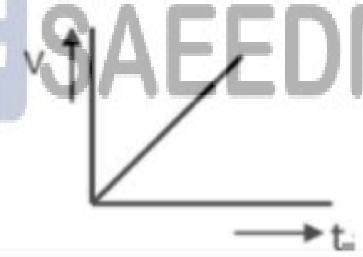
A

B



C

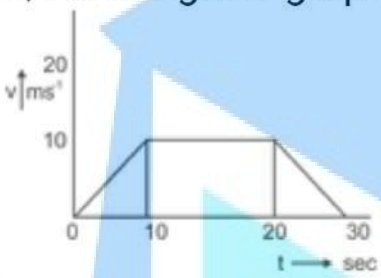
D



09 : 27

Q 9/10 10 min Hint

Q : In the given graph distance traveled is:



A 200m

B 300 m

C 250 m

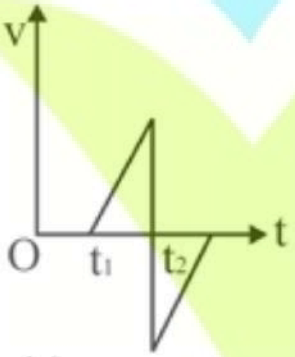
D 400m

09 : 24

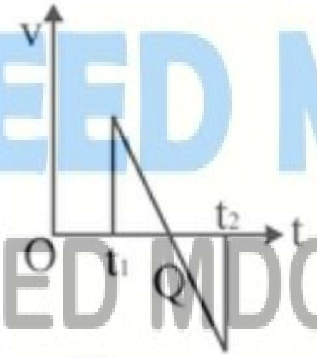
Q 10/10 10 min Hint

Q : A batsman hits a sixer and the ball reaches out of the cricket ground. Which of the following graphs describes the variation of the cricket ball's vertical velocity v with time between t_1 (the time of hitting the bat and time t_2 (the time of touching the ground)?

A



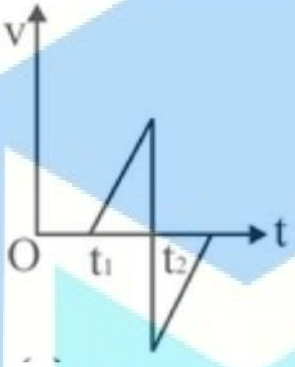
B



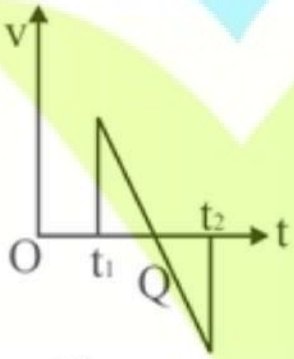
C

t_2 (the time of touching the ground)?

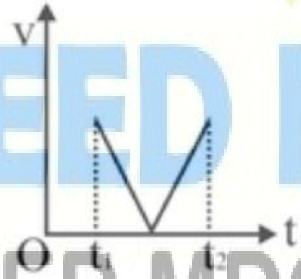
A



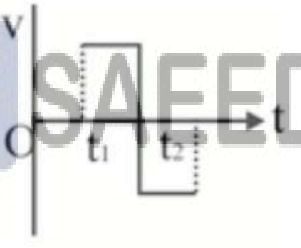
B



C



D



QUIZ RESULT

Practice test 2 unit 1

10

10 min

19-Feb-2021

0 sec

0/10

0.0%

Result Detail

Correct Unattempted

Incorrect Q 1/10

Q :
A constant force F changes the velocity of a 80kg sprinter from 3ms-1 to 4ms-1 in 0.5 sec. The acceleration of sprinter will be

A 1.5ms-2

B 2.5 ms-2

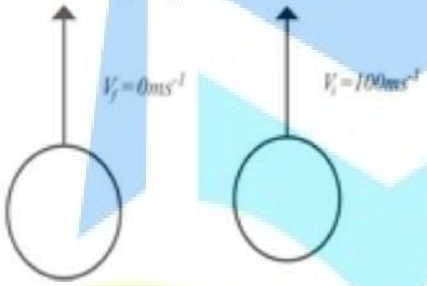
C 2.0 ms^{-2}

D 3.0 ms-2

Explanation

$$a = \frac{v_f - v_i}{t} = \frac{4-3}{0.5} = 2ms^{-2}$$

Q : A ball is projected upwards with an initial velocity $V_i = 100\,ms^{-1}$ as shown in the figure. It comes back after sometime and strikes ground with the same velocity but pointing downward. What is the angle between acceleration when moving upward to acceleration coming down?



A 180°

B 90°

C 60°

D 0°

Explanation

Direction of acceleration due to gravity toward earth center.

Correct
Unattempted
Incorrect
Q 3/10

Q :
A baseball is thrown vertically into the air. The acceleration of the ball at its highest point is:

A Zero

B g, up

C g, down

D 2g, down

Explanation

The acceleration of ball at highest point when thrown vertically upward option (c) g, down.

Correct Unattempted

Incorrect Q 4/10

Q :

A passenger in a moving train tosses a coin. If the coin falls behind him, the train must be moving with

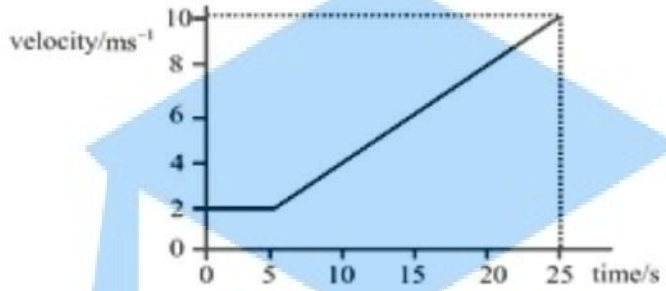
A An acceleration

B a deceleration

C A uniform speed

D any of the above

the displacement of the particle between 0 s and 25 s?



A 90 m

B 130 m

C 120

D 150 m

Explanation

Explanation Displacement = area under graph

$$= (2 \times 5) + \frac{1}{2}(25-5)(2+10)$$

$$= 130\,m$$

Practice test 2 unit 1

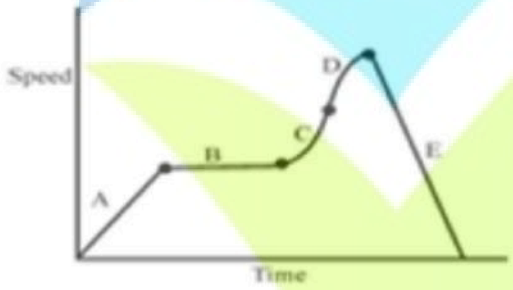
Correct

Unattempted

Incorrect

Q 6/10

Q : The graph shows how the speed of an object changes with time. Which section of the graph shows the object moving with an increasing acceleration?



A A

B B

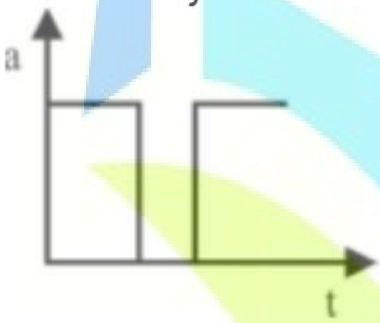
C C

D D

Correct Unattempted

Incorrect Q 7/10

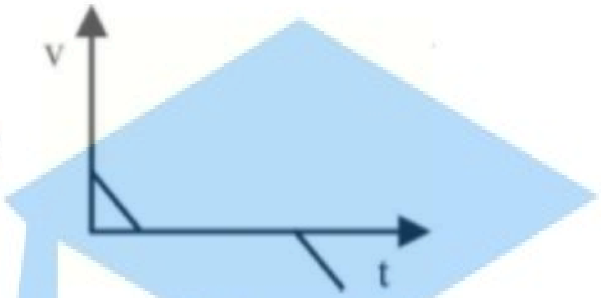
Q : Acceleration-time graph of a body is shown. The Corresponding velocity time graph of the same body is



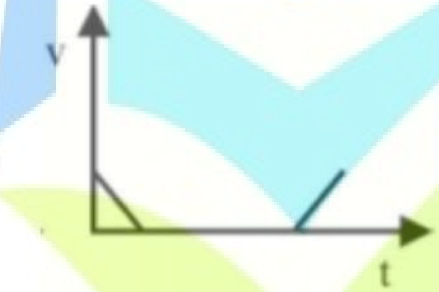
A

B

C



D



Explanation

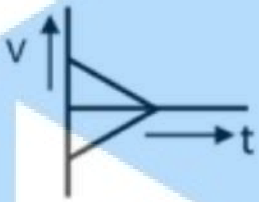
Rate of change of velocity is acceleration.

We know that $a = \frac{\Delta v}{\Delta t}$ where a is acceleration and v is velocity. In the given graph acceleration is constant for first part of motion. So, velocity increases uniformly.

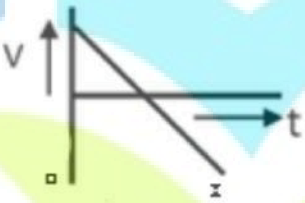
When a=0 i.e, $0 = \frac{\Delta v}{\Delta t} \Rightarrow$ v = constant Thus, we can draw velocity time graph as:

A

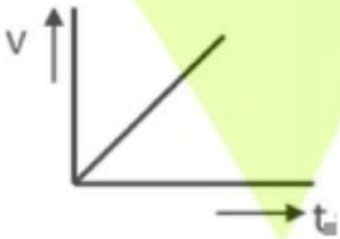
B



C

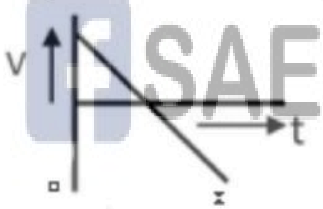


D



Explanation

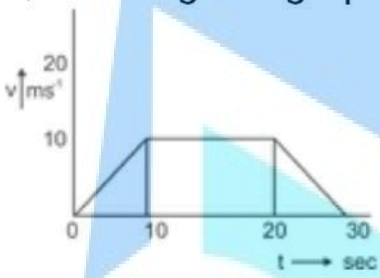
Explanation It v-t graph is:



Correct Unattempted

Incorrect 9/10

Q : In the given graph distance traveled is:



A 200m

B 300 m

C 250 m

D 400m

Explanation

S=Area under the graph, S= Area of trapezium, $S = \frac{1}{2}(30+10)(10) = 200m$

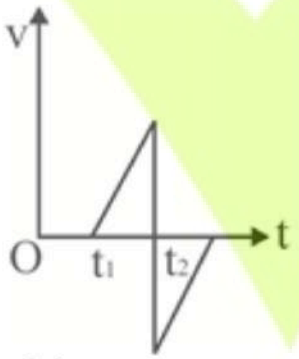
Practice test 2 unit 1

Correct Unattempted

Incorrect Q 10/10

Q : A batsman hits a sixer and the ball reaches out of the cricket ground. Which of the following graphs describes the variation of the cricket ball's vertical velocity v with time between t_1 (the time of hitting the bat and time t_2 (the time of touching the ground)?

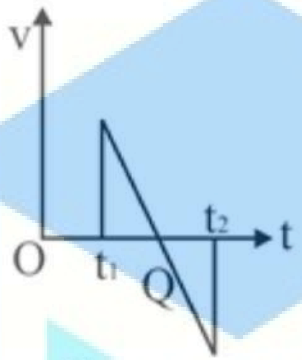
A



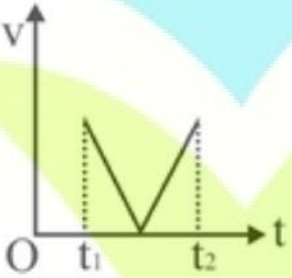
B

4 5 6 7 8 9 10

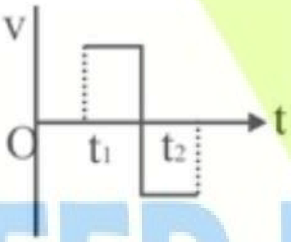
B



C



D



Explanation

Initially the ball has vertical component of motion upward. It decreases, becomes zero and then begins to increase in downward direction.

QUIZZES

Practice test 3 unit 1

10 Questions

7 min

Topics

Newton's laws of motion, Linear Momentum, Law of conservation of momentum

Start Quiz

06 : 57

Q 1/10 7 min Hint

Q :
The engine of a car produces an acceleration of 6 ms−2 in the car. If this car pulls another car of the same mass, then the acceleration would be

A 6 ms−2

B 12 ms−2

C 3 ms−2

D 1.5 ms−2

1 2 3 4 5 6 7

06 : 55

Q 2/10 7 min Hint

Q :

What is the resultant force shown in fig?

A 7 N towards

B 17 N in arbitrary direction

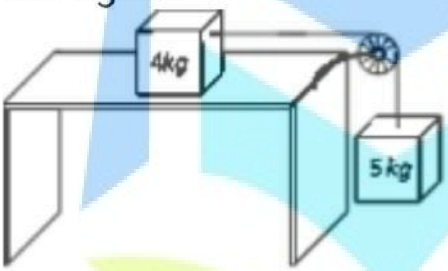
C 3 N toward left

D 10 N towards left

06 : 53

Q 3/10 7 min Hint

Q : Two masses of 4 kg and 5 kg are connected by a string passing through a frictionless pulley and are kept on a frictionless table as shown in the figure.



The acceleration of 5 kg mass is

A 49m/s2

B 5.44m/s2

C 19.5m/s2

D 2.72m/s2

06 : 51

Q 4/10 7 min Hint

Q : A particle of mass "m" is projected with a velocity $6\hat{i}+8\hat{j}$. Find the change in momentum when it touches ground:

A 16 m

B 12 m

C 10 m

D 20 m

06 : 49

Q 5/10 7 min Hint

Q :

Two masses of 1 gm and 4 gm are moving with the same kinetic energy. The ratio of their linear momentum will be

A 1:16

B 1:2

C $\sqrt{2}$:1

D 4:1

06 : 47

Q 6/10 7 min Hint

Q : When the velocity is doubled:

A K.E is doubled

B Acceleration is doubled

C Momentum is doubled

D P.E is doubled

1 2 3 4 5 6 7

06 : 45

Q 7/10 7 min Hint

Q :
The momentum is most closely related to

A Force

B Impulse

C Power

D K.E.

06 : 42

Q 8/10 7 min Hint

Q :
A wagon weighing 1000 kg is moving with a velocity 50 km/h on smooth horizontal rails. A mass of 250 kg is dropped into it. The velocity with which it moves now is

A 40 km/hour

B 50 km/hour

C 2.5 km/hour

D 20 km/hour

4 5 6 7 8 9 10

06 : 40

Q 9/10 7 min Hint

Q : In which of the following cases forces may not be required to keep the

A Particle going in a circle

B Particle going along a straight line

C The momentum of the particle constant

D Acceleration of the particle constant

06 : 37

Q 10/10 7 min Hint

Q : The motion of a rocket is based on the principle of conservation of

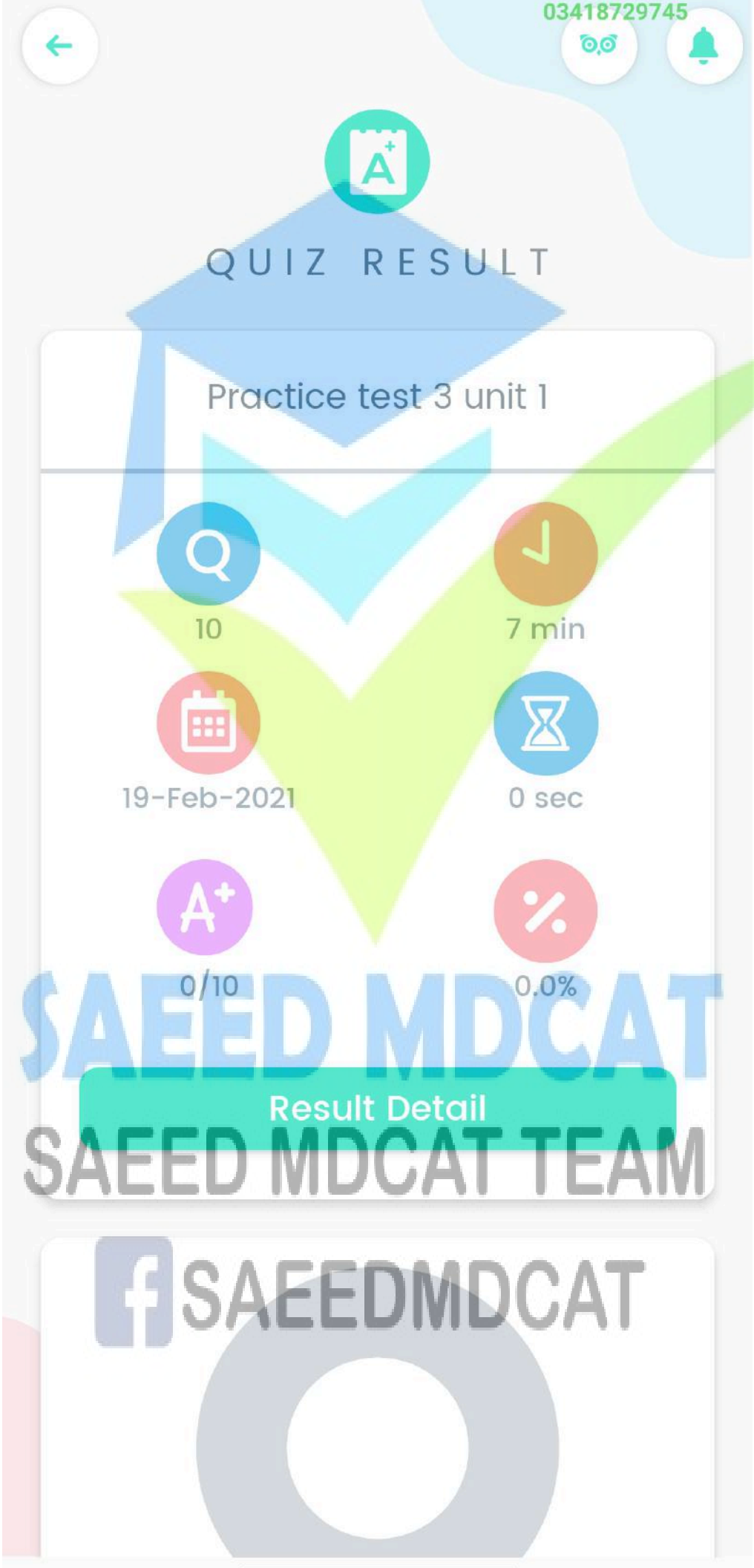
A Mass

B Kinetic energy

C Linear momentum

D Angular momentum

4 5 6 7 8 9 10



Q :
The engine of a car produces an acceleration of 6 ms−2 in the car. If this car pulls another car of the same mass, then the acceleration would be

A 6 ms−2

B 12 ms−2

C 3 ms−2

D 1.5 ms−2

Explanation

Force applied by engine = 6ms-2
When two cars are pulled,

$(m + m)a = 6ms^{-2}$

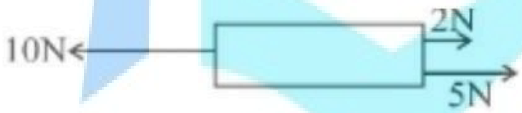
$2ma = 6ms^{-2}$ or $a = 3ms^{-2}$

Correct Unattempted

Incorrect Q 2/10

Q :

What is the resultant force shown in fig?



A 7 N towards

B 17 N in arbitrary direction

C 3 N toward left

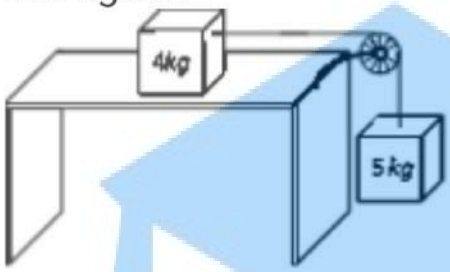
D 10 N towards left

Explanation

According to 2nd law of motion.

$F_{net} = 10 + 2 - 5 = 3\ N\ towards\ left$

by a string passing through a frictionless pulley and are kept on a frictionless table as shown in the figure.



The acceleration of 5 kg mass is

A 49m/s2

B 5.44m/s2

C 19.5m/s2

D 2.72m/s2

Explanation

$$a = \frac{m_2}{m_1 + m_2} \times g = \frac{5}{4+5} \times 9.8 = \frac{49}{9} = 5.44\,ms$$

Practice test 3 unit 1

Correct Unattempted

Incorrect Q 4/10

Q : A particle of mass "m" is projected with a velocity $6\hat{i}+8\hat{j}$. Find the change in momentum when it touches ground:

A 16 m

B 12 m

C 10 m

D 20 m

Explanation

$P = mv$ $|\vec{v}| = \sqrt{6^2+8^2} = 10$

$P = 10m$

Correct Unattempted

Incorrect Q 5/10

Q :

Two masses of 1 gm and 4 gm are moving with the same kinetic energy. The ratio of their linear momentum will be

A 1:16

B 1:2

C $\sqrt{2}:1$

D 4:1

Explanation

$$P = \sqrt{2m\,K.E} \Rightarrow \frac{P_1}{P_2} = \sqrt{\frac{1}{4} \times \frac{E}{E}} = \frac{1}{2}$$

Correct Unattempted

Incorrect Q 6/10

Q : When the velocity is doubled:

A K.E is doubled

B Acceleration is doubled

C Momentum is doubled

D P.E is doubled

Explanation

$P = mv, P' = m(2v) = 2P$

Correct Unattempted

Incorrect Q 7/10

Q :
The momentum is most closely related to

A Force

B Impulse

C Power

D K.E.

A wagon weighing 1000 kg is moving with a velocity 50 km/h on smooth horizontal rails. A mass of 250 kg is dropped into it. The velocity with which it moves now is

A 40 km/hour

B 50 km/hour

C 2.5 km/hour

D 20 km/hour

Explanation

m1 = 1000 kg
v1 = 50 kmph
m2 = 1000 + 250 = 1250 kg.
v2 = ?
by principle of conservation of momentum,
m1v1 = m2 v2
v2 = {(m1v1) / (m2)} = {(1000 × 50) / (1250)}
v2 = 40 kmph

Practice test 3 unit 1

Correct Unattempted

Incorrect Q 9/10

Q : In which of the following cases forces may not be required to keep the

A Particle going in a circle

B Particle going along a straight line

C The momentum of the particle constant

D Acceleration of the particle constant

Explanation

If momentum remains constant then force will be zero because

$$F = \frac{\Delta p}{\Delta t}$$

Correct
Unattempted
Incorrect
Q 10/10

Q : The motion of a rocket is based on the principle of conservation of

A Mass

B Kinetic energy

C Linear momentum

D Angular momentum

QUIZZES

Practice test 4 unit 1

10 Questions

7 min

Topics

Collision, Elastic collision, Elastic collision in one dimension under different cases

Start Quiz

06 : 57

Q 1/10 7 min Hint

Q :
A billiard ball moving with a speed of 5 m/s collide with an identical ball, originally at rest. If first ball stops dead after the collision, then second ball will move forward with speed of

A 10 m/s

B 5 m/s

C 2.5 m/s

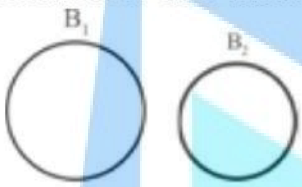
D 9 m/s

1 2 3 4 5 6 7

06 : 55

Q 2/10 7 min Hint

Q : When a very heavy ball 'B1' collide with a stationary target 'B2' of negligible mass, after collision the final velocity of ball 'B2' will



A become zero

B become half

C become doubled as compared to B1

D same as the B1

1 2 3 4 5 6 7

06 : 54

Q 3/10 7 min Hint

Q : A 10 kg object collides with stationary 5 kg object and after collision they stick together and move forward with velocity 4ms−1. What is the velocity with which the 10 kg object hit the second one

A 6ms−1

B 8ms−1

C 12ms−1

D 10ms−1

06 : 52

Q 4/10 7 min Hint

Q :
When a ball bounces back from floot such that sound and heat is produced then collision

A Must be elastic

B Must be inelastic

C Momentum is conserved but K.E is not conserved

D Both B and C

06 : 50

Q 5/10 7 min Hint

Q :

A ball of mass 2 kg travelling at 8 ms^{-1} strikes a ball of mass 4 kg travelling at 2 ms^{-1}. Both balls are moving along the same straight line as shown

After collision, both balls move at the same velocity v. What is the magnitude of the velocity v?

A 4 ms^{-1}

B 5 ms^{-1}

C 6 ms^{-1}

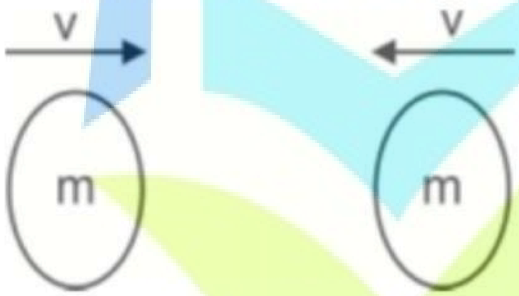
D 8 ms^{-1}

06 : 44

Q 6/10 7 min Hint

Q :

Two similar spheres, each of mass m and travelling with speed v, are moving towards each other.



The spheres have a head on elastic collision. Which statement is correct?

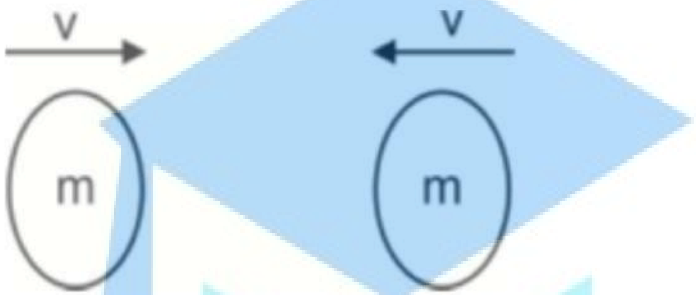
A The spheres stick together on impact

B The total kinetic energy after impact is mv^2

C The total kinetic energy before impact is zero

06 : 42

Two similar spheres, each of mass m and travelling with speed v, are moving towards each other.



The spheres have a head on elastic collision. Which statement is correct?

A The spheres stick together on impact

B The total kinetic energy after impact is mv^2

C The total kinetic energy before impact is zero

D The total momentum before impact is 2 mv

06 : 39

Q 7/10 7 min Hint

Q :

Two railway trucks of masses m and 3m move towards each other in opposite directions with speeds 2v and v respectively. These trucks collide and stick together.

What is the speed of the trucks after the collision?

A $\frac{v}{4}$

B $\frac{v}{2}$

C v

D $\frac{5v}{4}$

1 2 3 4 5 6 7

06 : 33

Q :
Which one of the following is true in the case of inelastic collision?

A
Total energy Kinetic Energy Momentum
Conserved Conserved
Conserved

B
Total energy Kinetic Energy Momentum
Conserved Not conserved Conserved

C
Total energy Kinetic Energy Momentum
Conserved Conserved Not conserved

D
Total energy Kinetic Energy Momentum
Not conserved Not conserved Conserved

06 : 31

Q 9/10 7 min Hint

Q :
A ball is dropped from a height of 10 m. It is embedded 1 m in sand and stops. In this process

A only momentum is conserved

B only kinetic energy is conserved

C both momentum and kinetic energy are conserved

D neither momentum nor kinetic energy is conserved

06 : 29

Q 10/10 7 min Hint

Q :

When two bodies collide elastically then the quantity conserved is

A Kinetic energy

B Momentum

C Both

D None

4 5 6 7 8 9 10

QUIZ RESULT

Practice test 4 unit 1

10

7 min

19-Feb-2021

0 sec

0/10

0.0%

Result Detail

Correct Unattempted

Incorrect Q 1/10

Q :
A billiard ball moving with a speed of 5 m/s collide with an identical ball, originally at rest. If first ball stops dead after the collision, then second ball will move forward with speed of

A 10 m/s

B 5 m/s

C 2.5 m/s

D 9 m/s

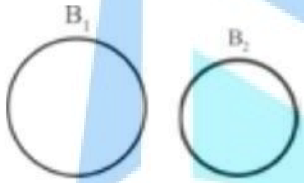
Explanation

When two identical balls collide elastically their velocities are interchange.

Incorrect

Q 2/10

Q : When a very heavy ball 'B1' collide with a stationary target 'B2' of negligible mass, after collision the final velocity of ball 'B2' will



A become zero

B become half

C become doubled as compared to B1

D same as the B1

Explanation

$m_1 >> m_2, v_2 = 0$

$v'_1 = v_1, v'_2 = 2v_1$

Incorrect

Q 3/10

Q : A 10 kg object collides with stationary 5 kg object and after collision they stick together and move forward with velocity 4ms−1. What is the velocity with which the 10 kg object hit the second one

A 6ms−1

B 8ms−1

C 12ms−1

D 10ms−1

Explanation

$$m_1 v_1 = (m_1 + m_2) v_c$$

$$v_1 = \left(\frac{m_1 + m_2}{m_1}\right) v_c$$

$$= \frac{15}{10} \times 4 = 6 ms^{-1}$$

Correct Unattempted

Incorrect Q 4/10

Q :
When a ball bounces back from floot such that sound and heat is produced then collision

A Must be elastic

B Must be inelastic

C Momentum is conserved but K.E is not conserved

D Both B and C

Explanation

Application of elastic collision

Q :

A ball of mass 2 kg travelling at 8 ms^{-1} strikes a ball of mass 4 kg travelling at 2 ms^{-1}. Both balls are moving along the same straight line as shown

After collision, both balls move at the same velocity v. What is the magnitude of the velocity v?

A 4 ms^{-1}

B 5 ms^{-1}

C 6 ms^{-1}

D 8 ms^{-1}

Explanation

The spheres have a head on elastic collision. Which statement is correct?

A. The spheres stick together on impact

B. The total kinetic energy after impact is mv^2

C. The total kinetic energy before impact is zero

D. The total momentum before impact is 2 mv

Explanation

Kinetic energy is conserved for elastic collision.

What is the speed of the trucks after the collision?

A $\frac{v}{4}$

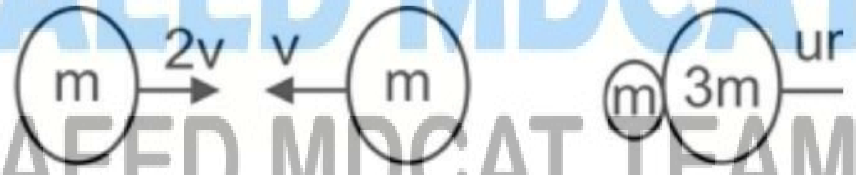
B $\frac{v}{2}$

C v

D $\frac{5v}{4}$

Explanation

This is a perfectly inelastic collision.



$$m(2v)+3m(-v)=(m+3m)v_t$$

$$-mv=4mv_1$$

$$v_1=-\frac{1}{4}v$$

What is the speed of the trucks after the collision?

A $\frac{v}{4}$

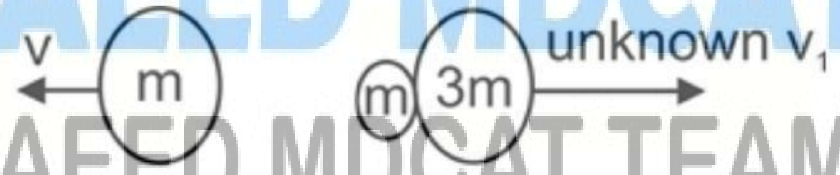
B $\frac{v}{2}$

C v

D $\frac{5v}{4}$

Explanation

fectly inelastic collision.



$-v) = (m + 3m)v_t$

A
Total energy Conserved
Kinetic Energy Momentum Conserved
Conserved Conserved

B
Total energy Conserved
Kinetic Energy Momentum Not conserved
Conserved Conserved

C
Total energy Conserved
Kinetic Energy Momentum Conserved
Conserved Not conserved

D
Total energy Not conserved
Kinetic Energy Momentum Not conserved
Conserved Conserved

Explanation

Total momentum and total energy remain conserved in all types pf collision.

Incorrect 9/10

Q :
A ball is dropped from a height of 10 m. It is embedded 1 m in sand and stops. In this process

A only momentum is conserved

B only kinetic energy is conserved

C both momentum and kinetic energy are conserved

D neither momentum nor kinetic energy is conserved

Explanation

During inelastic collision only momentum is conserved

Incorrect

Q 10/10

Q :

When two bodies collide elastically then the quantity conserved is

A Kinetic energy

B Momentum

C Both

D None

Explanation

When bodies collide elastically both momentum and K.E remain conserved.

QUIZZES

Practice test 5 unit # 1

10 Questions

7 min

Topics

Projectile motion

Start Quiz

06 : 58

Q 1/10 7 min Hint

Q :
A cricket ball is hit at 45° to the horizontal with a kinetic energy K. The kinetic energy at the highest point is

A 0

B K/2

C $K/\sqrt{2}$

D K

1 2 3 4 5 6 7

06 : 56

Q 2/10 7 min Hint

Q :
A bomber drops a bomb, when it is vertically above the target. Its misses the target because

A Vertically component of the velocity of the bomber

B Force of gravity

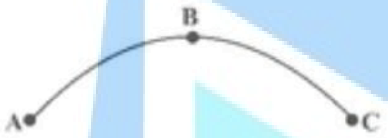
C Acceleration of the bomber

D Horizontal component of the velocity of the bomber

06 : 54

Q 3/10 7 min Hint

Q :
A parabolic path for a projectile is shown in the figure. At which point acceleration is minimum?



A B

B A

C C

D Not possible

06 : 52

Q 4/10 7 min Hint

Q :
A body is thrown horizontally from the top of a tower of height 5 m. It touches the ground at a distance of 10 m from the foot of the tower. The initial velocity of the body is (g = 10 ms-2)

A $2.5ms^{-1}$

B $5ms^{-1}$

C 10ms-1

D 20ms-1

06 : 51

Q 5/10 7 min Hint

Q :

A ball is thrown horizontally from the top of a tower. What happens to the horizontal component of its acceleration?

A First increases and then decreases

B Increase

C Decrease

D Zero

06 : 49

Q 6/10 7 min Hint

Q :
At maximum height in projectile motion the horizontal component of velocity will

A Maximum

B Zero

C Constant

D Both (b) and (c)

06 : 47

Q 7/10 7 min Hint

Q : An aero plane is flying horizontally with a velocity of 10 m/s and at a height of 1960 m. When it is vertically above a point A on the ground, a bomb is released from it. The bomb strikes the ground at point B. The distance AB is (ignoring air resistance)

A 100 m

B 200 m

C 400 m

D 2 km

1 2 3 4 5 6 7

06 : 44

Q 8/10 7 min Hint

Q :
A projectile is fired horizontally from a 490m high cliff with a velocity of 80ms-1. The time taken by the projectile to reach the ground is

A 10 sec

B 7.5 sec

C 2.5 sec

D 5 sec

06 : 43

Q 9/10 7 min Hint

Q : A man projects a coin upwards from the gate of a uniformly moving train. The path of coin for the man will be

A Parabolic

B Inclined straight line

C Vertical straight line

D Horizontal straight line

06 : 41

Q 10/10 7 min Hint

Q :
For projectile motion in the absence of air resistance:

A Vertical speed is constant

B Horizontal force is constant

C Horizontal acceleration is zero

D Vertical acceleration is zero

QUIZ RESULT

Practice test 5 unit # 1

10

7 min

19-Feb-2021

0 sec

0/10

0.0%

Result Detail

Incorrect

1/10

Q :
A cricket ball is hit at 45° to the horizontal with a kinetic energy K. The kinetic energy at the highest point is

A 0

B K/2

C $K/\sqrt{2}$

D K

Explanation

Kinetic energy at highest point,

$$K_H = K\cos^2 45° = \frac{K}{2}$$

Incorrect

Q 2/10

Q :
A bomber drops a bomb, when it is vertically above the target. Its misses the target because

A Vertically component of the velocity of the bomber

B Force of gravity

C Acceleration of the bomber

D Horizontal component of the velocity of the bomber

Explanation

Due to air friction, horizontal velocity of bomb changes

Incorrect

Q 3/10

Q :
A parabolic path for a projectile is shown in the figure. At which point acceleration is minimum?

A B

B A

C C

D Not possible

Explanation

For whole projectile trajectory
a=g

Incorrect

Q 4/10

Q :
A body is thrown horizontally from the top of a tower of height 5 m. It touches the ground at a distance of 10 m from the foot of the tower. The initial velocity of the body is (g = 10 ms-2)

A $2.5ms^{-1}$

B $5ms^{-1}$

C 10ms-1

D 20ms-1

Explanation

$$S = v \times \sqrt{\frac{2h}{g}} \Rightarrow 10 = v \times \sqrt{2 \times \frac{5}{10}} \Rightarrow v = 10$$

Q :

A ball is thrown horizontally from the top of a tower. What happens to the horizontal component of its acceleration?

A First increases and then decreases

B Increase

C Decrease

D Zero

Explanation

For projectile motion: Fx = 0 , ax = 0

Practice test 5 unit # 1

Correct
Unattempted
Incorrect
6/10

Q :
At maximum height in projectile motion the horizontal component of velocity will

A Maximum

B Zero

C Constant

D Both (b) and (c)

Explanation

In projectile motion the horizontal component of velocity will remain constant

Incorrect

Q 7/10

Q : An aero plane is flying horizontally with a velocity of 10 m/s and at a height of 1960 m. When it is vertically above a point A on the ground, a bomb is released from it. The bomb strikes the ground at point B. The distance AB is (ignoring air resistance)

A 100 m

B 200 m

C 400 m

D 2 km

Explanation

$$AB = R = v\sqrt{\frac{2H}{g}} = 10\times\sqrt{\frac{2\times1960}{9.8}}$$

$$R = 10\times20 = 200\ m$$

Incorrect

8/10

Q :
A projectile is fired horizontally from a 490m high cliff with a velocity of 80ms-1. The time taken by the projectile to reach the ground is

A 10 sec

B 7.5 sec

C 2.5 sec

D 5 sec

Explanation

$$y = \frac{1}{2}gt^2$$

$$t = \sqrt{\frac{2y}{g}} = \sqrt{\frac{2\times 490}{9.8}} = 10\,sec$$

Correct Unattempted

Incorrect Q 9/10

Q : A man projects a coin upwards from the gate of a uniformly moving train. The path of coin for the man will be

A Parabolic

B Inclined straight line

C Vertical straight line

D Horizontal straight line

Explanation

Because horizontal velocity is same for coin and the observer. So relative horizontal displacement will be zero.

Correct Unattempted

Incorrect Q 10/10

Q :
For projectile motion in the absence of air resistance:

A Vertical speed is constant

B Horizontal force is constant

C Horizontal acceleration is zero

D Vertical acceleration is zero

Explanation

$F_x = ma_x = 0$

$a_x = 0$

$v_x = \text{constant}$

QUIZZES

Practice test 6 unit # 1

10 Questions

7 min

Topics

Characteristics of projectile motion, Time of flight, Maximum height, Horizontal range, Effect of Air Resistance in Projectile Motion

Start Quiz

06 : 57

Q 1/10 7 min Hint

Q : A body of mass 1 kg is thrown with a velocity of 10 ms-1 at an angle of 60° with the horizontal. Its momentum at the highest point is

A 2 kg ms−1

B 3 kg ms−1

C 4 kg ms−1

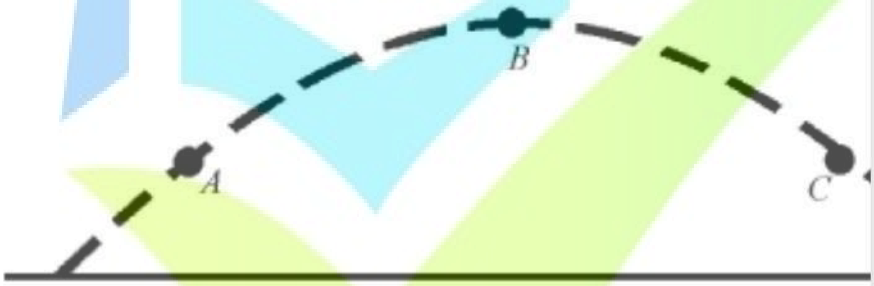
D 5 kg ms−1

1 2 3 4 5 6 7

06 : 55

Q 2/10 7 min Hint

Q :
A cannonball is fired and follows the parabolic path shown below. Air resistance is negligible. Point B is the highest point on the path and points A and C are at the same height.



How do the speeds of the cannonball at the there points compare?

A $v_A < v_B < v_C$

B $v_C < v_B < v_A$

C $v_B < v_A < v_C$

D $v_B < v_A = v_C$

1 2 3 4 5 6 7

06 : 51

Q 3/10 7 min Hint

Q : A projectile is projected at angle of 30o with an initial velocity of 10 m/sec. It will go upto height of _____

A 10 m

B 2.5 m

C 1.25 m

D 0.75 m

06 : 49

Q 4/10 7 min Hint

Q : The angle of projection for which the maximum height and the horizontal range of a projectile are equal to

A 45o

B $\tan^{-1}(\frac{1}{4})$

C tan-1(4)

D None of these

06 : 47

Q 5/10 7 min Hint

Q : If a projectile is thrown with 19.6m/s velocity at 30° with x-axis, time taken to reach highest point?

A 1 sec

B 2 sec

C 3 sec

D 4 sec

06 : 45

Q 6/10 7 min Hint

Q : A missile is fired for maximum range with a initial velocity of 20 m/s. If g=10m/s2, the range of the missile is

A 30 m

B 20 m

C 40 m

D 60 m

06 : 43

Q 7/10 7 min Hint

Q : If the initial speed of a projectile is doubled:

A Its range will double

B Its range will quadruple

C Its range will be decreased by a factor of two

D Its range will decrease by a factor of four

1 2 3 4 5 6 7

06 : 40

Q 8/10 7 min Hint

Q : The path of projectile in presence of air friction is more likely to be

A Parabolic

B Circle

C Elliptical

D Straight line

06 : 38

Q 9/10 7 min Hint

Q : In presence of air resistance, which one will be true for horizontal component of acceleration of projectile

A ax = 0

B ax = g

C ax ≠ 0

D ax = -Fx

06 : 36

Q 10/10 7 min Hint

Q :
If a projectile is projected with initial speed 20 msec-1 at angle 750 with horizontal in presence of air friction, then which of the following may be the range of projectile

A 36 m

B 27 m

C 20 m

D 17 m

QUIZ RESULT

Practice test 6 unit # 1

10

7 min

22-Feb-2021

0 sec

0/10

0.0%

Result Detail

Correct Unattempted

Incorrect Q 1/10

Q : A body of mass 1 kg is thrown with a velocity of 10 ms-1 at an angle of 60° with the horizontal. Its momentum at the highest point is

A 2 kg ms−1

B 3 kg ms−1

C 4 kg ms−1

D 5 kg ms−1

Explanation

$$P = mv\cos\theta$$

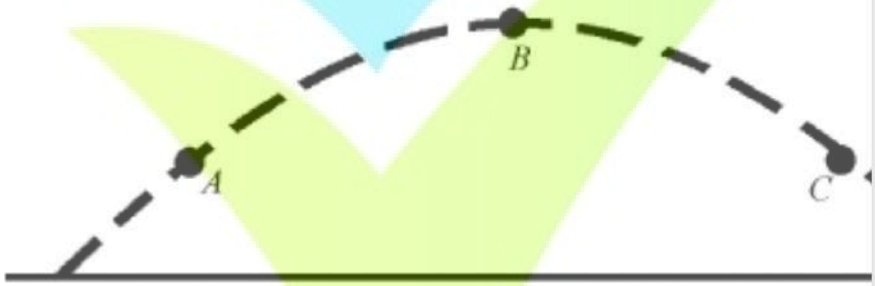
$$= 1 \times 10 \times \cos 60° = 10\left(\frac{1}{2}\right) kg\ ms^{-1}$$

$$= 5\ kg\ ms^{-1}$$

Correct Unattempted

Incorrect Q 2/10

Q :
A cannonball is fired and follows the parabolic path shown below. Air resistance is negligible. Point B is the highest point on the path and points A and C are at the same height.



How do the speeds of the cannonball at the there points compare?

A vA < vB < vC

B vC < vB < vA

C vB < vA < vC

D vB < vA = vC

Correct Unattempted

Incorrect Q 3/10

Q : A projectile is projected at angle of 30o with an initial velocity of 10 m/sec. It will go upto height of _____

A 10 m

B 2.5 m

C 1.25 m

D 0.75 m

Explanation

$$H = \frac{v_i^2 \sin^2\theta}{2g} = \frac{100 \times (\frac{1}{2})^2}{2 \times 10} = \frac{25}{20} = 1.25m$$

Correct Unattempted

Incorrect Q 4/10

Q : The angle of projection for which the maximum height and the horizontal range of a projectile are equal to

A 45o

B $\tan^{-1}(\frac{1}{4})$

C tan-1(4)

D None of these

Explanation

$H = \frac{R}{4}\tan\theta$

$\tan^{-1}(4) = \theta$

Correct Unattempted

Incorrect Q 5/10

Q : If a projectile is thrown with 19.6m/s velocity at 30° with x-axis, time taken to reach highest point?

A 1 sec

B 2 sec

C 3 sec

D 4 sec

Explanation

As the formula to reach maximum height is:

$$t = \frac{v_i \sin\theta}{g} = \frac{19.6 \times \sin 30}{9.8} = 1s$$

Correct Unattempted

Incorrect Q 6/10

Q : A missile is fired for maximum range with a initial velocity of 20 m/s. If g=10m/s2, the range of the missile is

A 30 m

B 20 m

C 40 m

D 60 m

Explanation

$$R_{max} = \frac{v_i^2}{g} = \frac{20 \times 20}{10} = 40m$$

Q : If the initial speed of a projectile is doubled:

A Its range will double

B Its range will quadruple

C Its range will be decreased by a factor of two

D Its range will decrease by a factor of four

Explanation

As $R \propto v_i^2$ so by doubling the initial velocity vi Range will quadruple or increases 4 times.

Correct Unattempted

Incorrect Q 8/10

Q : The path of projectile in presence of air friction is more likely to be

A Parabolic

B Circle

C Elliptical

D Straight line

Correct Unattempted

Incorrect Q 9/10

Q : In presence of air resistance, which one will be true for horizontal component of acceleration of projectile

A ax = 0

B ax = g

C ax ≠ 0

D ax = -Fx

Correct
Unattempted
Incorrect
Q 10/10

Q :
If a projectile is projected with initial speed 20 msec-1 at angle 750 with horizontal in presence of air friction, then which of the following may be the range of projectile

A 36 m

B 27 m

C 20 m

D 17 m

QUIZZES

Class Test-1 (Unit # 1)

30 Questions

25 min

Topics

Velocity, Displacement-time graph, Newton's laws of motion, Linear Momentum, Law of conservation of momentum, Projectile motion, Characteristics of projectile motion, Time of flight, Maximum height, Horizontal range, Effect of Air Resistance in Projectile Motion

Start Quiz

24 : 57

Q 1/30 25 min Hint

Q :
A train takes 1 hour to go from one station to the other. It travels at a speed of 30 kmh−1 for first half hour and at a speed of 50 kmh−1 for the next half hour. The average speed of the train is:

A 45 kmh−1

B 35 kmh−1

C 40 kmh−1

D 30 kmh-1

1 2 3 4 5 6 7

24 : 55

Q 2/30 25 min Hint

Q :

A boat is sent across a river with a velocity of 8kmh−1. If the resultant velocity of boat is 10kmh−1, then the velocity of the river is

A $12.8kmh^{-1}$

B $6kmh^{-1}$

C $8kmh^{-1}$

D $10kmh^{-1}$

24 : 53

Q 3/30 25 min Hint

Q :
Force of 5N acts on a body of 5kg for 5 sec then the rate of change in momentum is

A 25N

B 50N

C 5N

D 125N

1 2 3 4 5 6 7

24 : 52

Q 4/30 25 min Hint

Q : A cricket player catches a ball of mass 100 g and moving with a velocity of 25ms-1. If the ball is caught 0.1s, the force of the ball exerted on the hand of the player is:

A 4N

B 40N

C 25N

D 250N

24 : 49

Q 5/30 25 min Hint

Q :
A cricket ball of mass 0.5 kg strikes a bat normally with a velocity of 30 ms-1 and rebounds with a velocity of 20 ms-1 in the opposite direction. The impulse of the force exerted by the ball on the bat is

A 0.5 Ns

B 25 Ns

C 1.0 Ns

D 50 Ns

24 : 47

Q 6/30 25 min Hint

Q : The rate of change of momentum of a body falling freely under gravity is equal to its

A Impulse

B Kinetic energy

C Power

D Weight

1 2 3 4 5 6 7

24 : 45

Q 7/30 25 min Hint

Q : A particle of mass m moving with velocity v strikes a stationary particle of mass 2m and sticks to it. The speed of the system will be?

A $\frac{v}{2}$

B 2v

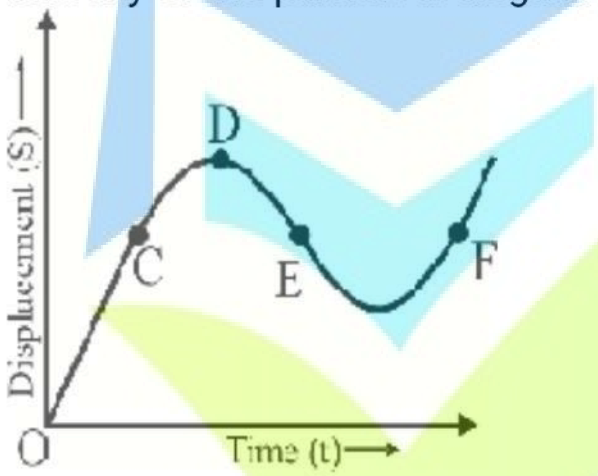
C $\frac{v}{3}$

D 3v

24 : 42

Q 8/30 25 min Hint

Q : The displacement time graph for a moving particle is given below. The instantaneous velocity of the particle is negative at the point



A D

B F

C C

D E

24 : 40

Q 9/30 25 min Hint

Q :
The displacement time graph of a particle moving with uniform velocity is

A Parabola

B Straight line

C Circle

D Hyperbola

24 : 20

Q 10/30 25 min Hint

Q :
The displacement-time graphs of two particles A and B are straight lines making angles of 30∘and 60∘respectively with the time axis. If the velocity of A is vA
and that of B is vB , the value of vA/vB is

A 1/2

B $\frac{1}{\sqrt{3}}$

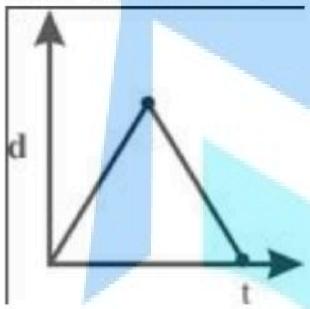
C $\sqrt{3}$

D 1/3

24 : 04

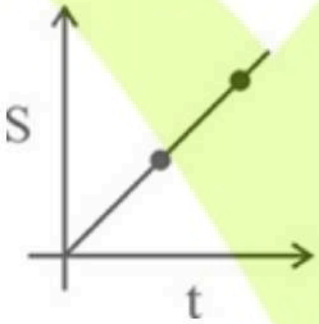
Q 11/30 25 min Hint

Q : To convert given displacement-time graph into distance time graph,

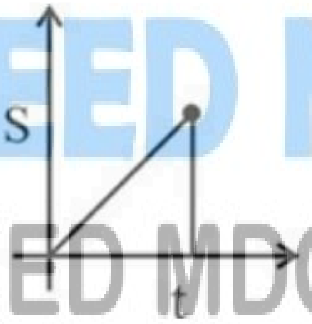


The corresponding distance time graph will be

A



B

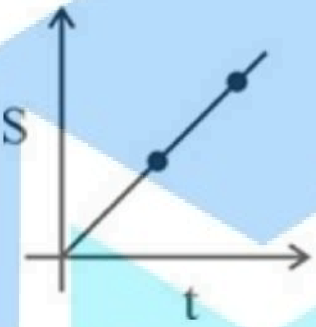


C

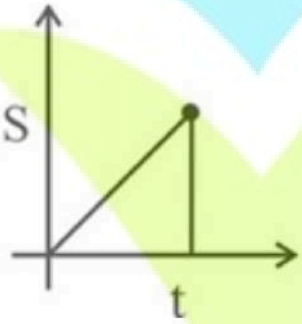
24 : 01

The corresponding distance time graph will be

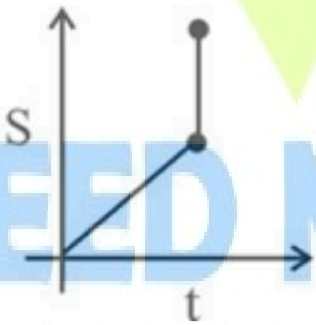
A



B



C



D

23 : 59

Q 12/30 25 min Hint

Q : The slope of the tangent of a point on d-t graph gives the magnitude of

A uniform velocity

B Instantaneous velocity

C average velocity

D constant velocity

23 : 57

Q 13/30 25 min Hint

Q :
If d-t curve is a straight line, it shows that body is

A average velocity

B uniform velocity

C both '(a)' and '(b)'

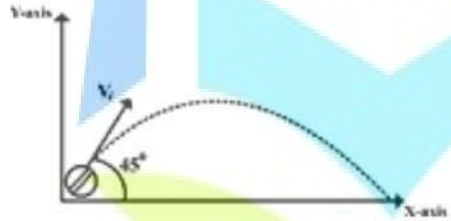
D instantaneous velocity

8 9 10 11 12 13 14

23 : 55

Q 14/30 25 min Hint

Q :
A projectile is projected upwards with an angle of 45° with x-axis at shown in the figure such that its K.E at projection is $100J$. What will be its K.E at the top?



A 0J

B 100J

C 25J

D 50J

8 9 10 11 12 13 14

23 : 52

Q 15/30 25 min Hint

Q :
At which point for a projectile its kinetic energy is completely converted into potential energy

A At point of projection

B At the highest point

C Point to hit the ground

D Not possible

23 : 50

Q 16/30 25 min Hint

Q :
A 1000-kg airplane moves in straight flight at constant speed. The force of air friction is 1800 N. The net force on the plane is:

A Zero

B 11800 N

C 1800 N

D 9800 N

12 13 14 15 16 17 18

23 : 48

Q 17/30 25 min Hint

Q :
A projectile of mass m is the thrown with a velocity v making an angle of 45° with the horizontal. The change in momentum from departure to arrival along vertical direction, is

A 2mv

B $\sqrt{2}mv$

C mv

D $\frac{mv}{\sqrt{2}}$

12 13 14 15 16 17 18

23 : 46

Q 18/30 25 min Hint

Q : A ball is projected horizontally from the top of a cliff on the surface of the earth with a speed of 40ms-1. Assuming that there is no air resistance, what will its speed be 3 s later?

A 30ms-1

B 40ms-1

C 50ms-

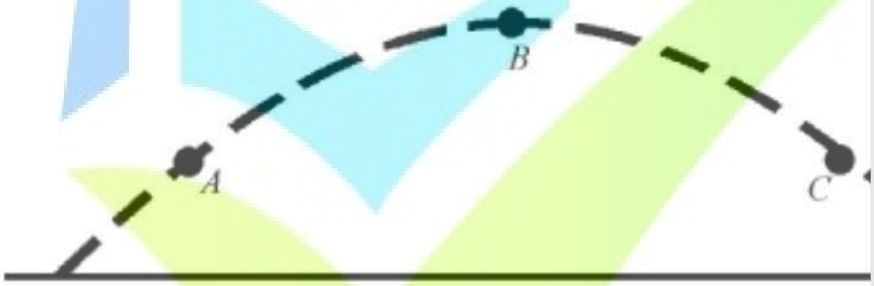
D 60ms-1

12 13 14 15 16 17 18

23 : 42

Q 19/30 25 min Hint

Q :
A cannonball is fired and follows the parabolic path shown below. Air resistance is negligible. Point B is the highest point on the path and points A and C are at the same height



Which of the following best describes the direction of the velocity of the cannonball at point B?

A to the right

B down and to the right

C up and to the right

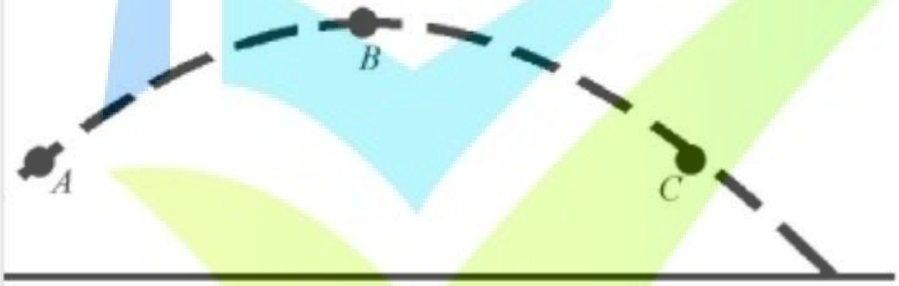
D up

15 16 17 18 19 20 21

23 : 34

Q 20/30 25 min Hint

all is fired and follows the parabolic
wn below. Air resistance is negligible.
the highest point on the path and
and C are at the same height.



he accelerations of the ball at the
nts compare?

A aA < aB < aC

B aB < aA < aC

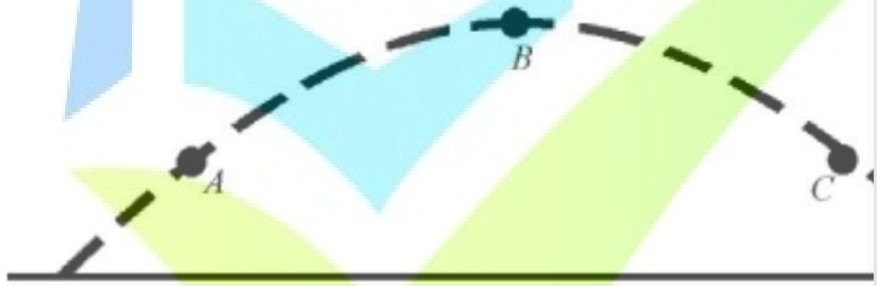
C aA = aB = aC

D aA = aB < aC

15 16 17 18 19 20 21

Q 20/30 25 min Hint

Q :
cannonball is fired and follows the parabolic path shown below. Air resistance is negligible. Point B is the highest point on the path and points A and C are at the same height.



How do the accelerations of the ball at the three points compare?

A aA < aB < aC

B aB < aA < aC

C aA = aB = aC

D aA = aB < aC

23 : 28

Q 21/30 25 min Hint

Q : Two balls projected at 30o and 60o with same initial velocities. The ratio of their maximum heights is:

A 1:2

B 1:4

C 1:3

D $1:\sqrt{2}$

15 16 17 18 19 20 21

23 : 25

Q 22/30 25 min Hint

Q : A projectile is projected with kinetic energy (K.E). If it has the maximum possible horizontal range, then its kinetic energy at the highest point will be:

A K.E

B 0.75 K.E

C 0.5 K.E

D 0.25 K.E

19 20 21 22 23 24 25

23 : 23

Q 23/30 25 min Hint

Q : A body is thrown with a velocity of 9.8 m/s making an angle of 30o with the horizontal. It will hit the ground after a time

A 1 sec

B 2 sec

C 3 sec

D 1.5 sec

19 20 21 22 23 24 25

23 : 21

Q 24/30 25 min Hint

Q :
Time of flight of projectile is

A $\frac{v_i \sin\theta}{g}$

B $\frac{v_i^{\ 2} \sin\theta}{g}$

C $\frac{2v_i \sin^2\theta}{g}$

D $\frac{2v_i \sin\theta}{g}$

23 : 20

Q 25/30 25 min Hint

Q : The maximum range of a projectile fired with some initial velocity is found to be 1000 m in the absence of wind and air resistance. The maximum height reached by the projectile is

A 250m

B 500 m

C 1000m

D 5000m

19 20 21 22 23 24 25

23 : 17

Q 26/30 25 min Hint

Q :
At which pair of angles the range of projectile would be same

A $30^o, 60^o$

B $25^o, 65^o$

C $15^o, 75^o$

D all of these

23 : 15

Q 27/30 25 min Hint

Q : Four projectiles are fired with the same velocity at angle, 25°, 40°, 55° and 70° with the horizontal. The range of projectile will be largest for the one projected at angle

A 70°

B 40°

C 55°

D 25°

23 : 13

Q 28/30 25 min Hint

Q :
Air resistance decreases the

A horizontal component of velocity of a projectile

B vertical component of velocity of a projectile

C vertical component of acceleration of a projectile

D none of these

22 23 24 25 26 27 28

23 : 10

Q 29/30 25 min Hint

Q :
When air resistance acts, acceleration during a fall will be

A greater than g

B less than g

C equal to g

D none of these

23 : 08

Q 30/30 25 min Hint

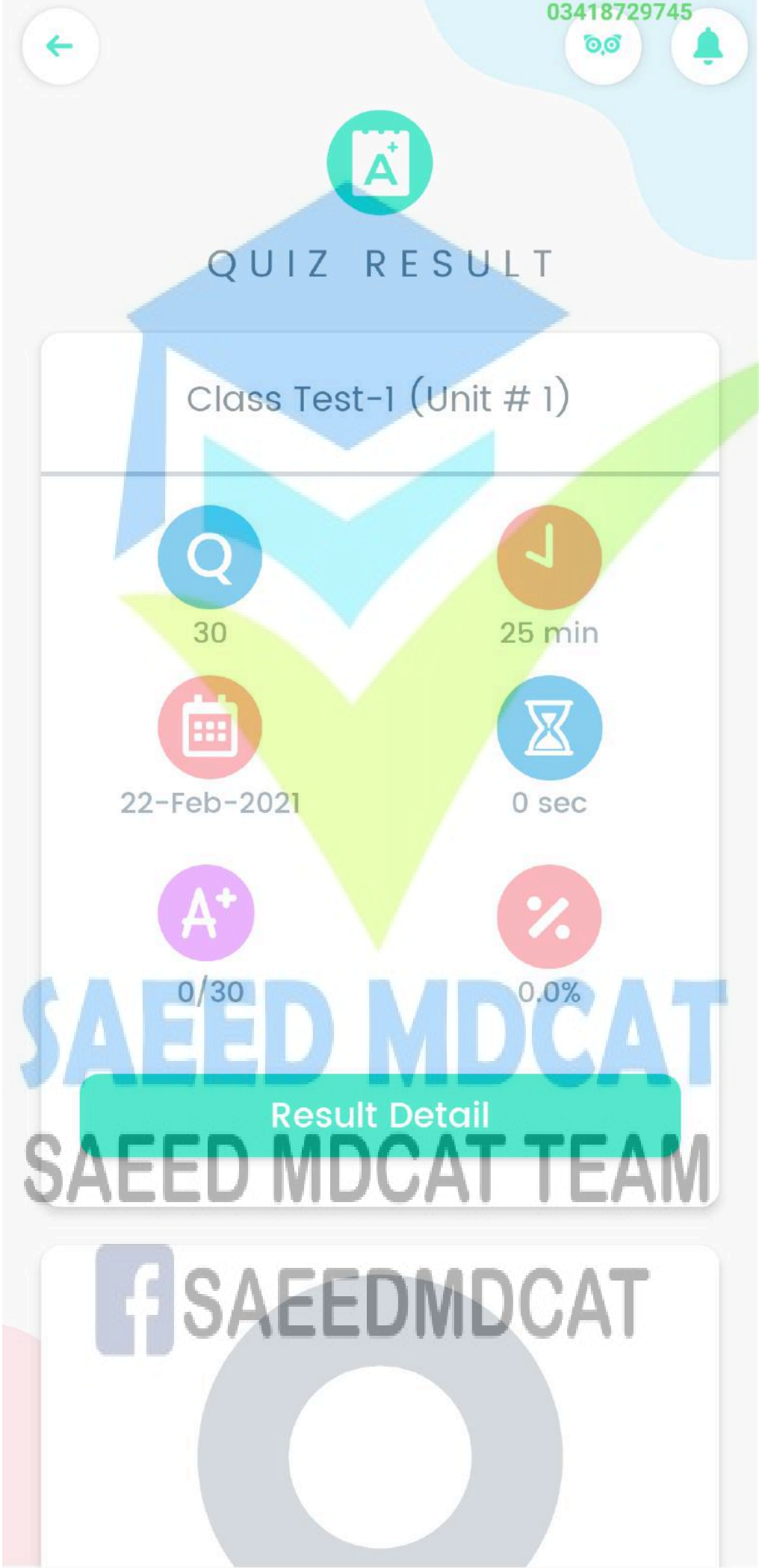
Q : The Factors affecting the flight path of a Projectile from the following are

A Air Resistance

B Gravity.

C Angle of Release

D All of these



Q :
A train takes 1 hour to go from one station to the other. It travels at a speed of 30 kmh−1 for first half hour and at a speed of 50 kmh−1 for the next half hour. The average speed of the train is:

A 45 kmh−1

B 35 kmh−1

C 40 kmh−1

D 30 kmh-1

Explanation

As it is the equal time partition case so

$$V_{av} = \frac{v_1 + v_2}{2} = \frac{30 + 50}{2} = \frac{80}{2} = 40 kmh^{-1}$$

Q :

A boat is sent across a river with a velocity of 8kmh−1. If the resultant velocity of boat is 10kmh−1, then the velocity of the river is

A $12.8kmh^{-1}$

B $6kmh^{-1}$

C $8kmh^{-1}$

D $10kmh^{-1}$

Explanation

$$v_r = \sqrt{{v_R}^2 - v_B^2} = \sqrt{10^2 - 8^2} = 6\ km$$

Correct Unattempted

Incorrect Q 3/30

Q :
Force of 5N acts on a body of 5kg for 5 sec then the rate of change in momentum is

A 25N

B 50N

C 5N

D 125N

Explanation

$$\frac{\Delta P}{\Delta t} = F$$

$$\frac{\Delta P}{\Delta t} = 5N$$

Correct Unattempted

Incorrect Q 4/30

Q : A cricket player catches a ball of mass 100 g and moving with a velocity of 25ms-1. If the ball is caught 0.1s, the force of the ball exerted on the hand of the player is:

A 4N

B 40N

C 25N

D 250N

Explanation

$$F = \frac{mv}{t} = \frac{(0.1)(25)}{0.1} = 25N$$

Incorrect | Q 5/30

Q :
A cricket ball of mass 0.5 kg strikes a bat normally with a velocity of 30 ms-1 and rebounds with a velocity of 20 ms-1 in the opposite direction. The impulse of the force exerted by the ball on the bat is

A 0.5 Ns

B 25 Ns

C 1.0 Ns

D 50 Ns

Explanation

Impulse=change in momentum

$I = mu - m(-v)$

$= m(u+v) = 0.5 \times (30+20) = 25\ Ns$

Correct Unattempted

Incorrect Q 6/30

Q : The rate of change of momentum of a body falling freely under gravity is equal to its

A Impulse

B Kinetic energy

C Power

D Weight

Explanation

$$F = \frac{\Delta p}{\Delta t} = w = mg$$

Correct Unattempted

Incorrect Q 7/30

Q : A particle of mass m moving with velocity v strikes a stationary particle of mass 2m and sticks to it. The speed of the system will be?

A $\frac{v}{2}$

B 2v

C $\frac{v}{3}$

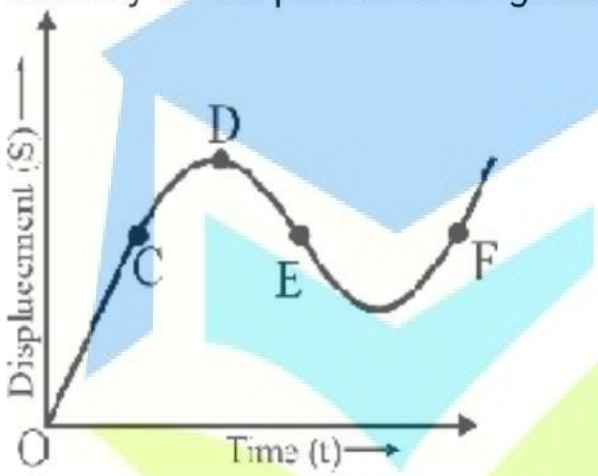
D 3v

Explanation

$$mv + 0 = (m + 2m)v'$$

$$v' = \frac{mv}{3m} = \frac{v}{3}$$

Q : The displacement time graph for a moving particle is given below. The instantaneous velocity of the particle is negative at the point



A D

B F

C C

D E

Explanation

At point E, the slope is decreasing negatively

moving with uniform velocity is

A Parabola

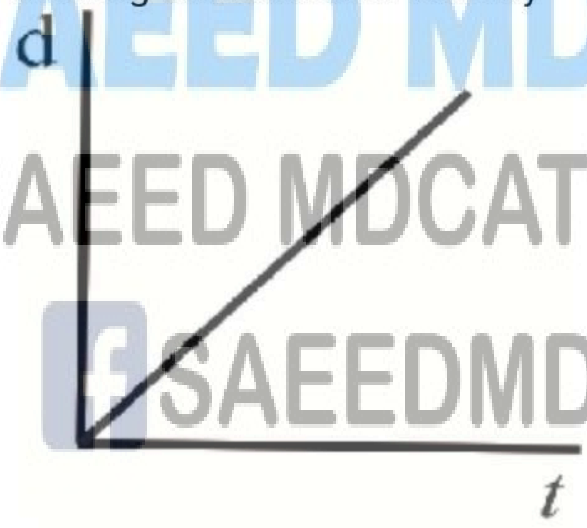
B Straight line

C Circle

D Hyperbola

Explanation

$\vec{d}-t$ graph represents that particle is moving with uniform velocity



Incorrect 10/30

Q :
The displacement-time graphs of two particles A and B are straight lines making angles of 30◦and 60◦respectively with the time axis. If the velocity of A is vA
and that of B is vB , the value of vA/vB is

A 1/2

B $\frac{1}{\sqrt{3}}$

C $\sqrt{3}$

D 1/3

Explanation

$v_A = tan30°$ and $v_B = tan60°$ $\therefore \frac{V_A}{V_B} = \frac{t}{t}$

Incorrect 10/30

Q :
The displacement-time graphs of two particles A and B are straight lines making angles of 30◦and 60◦respectively with the time axis. If the velocity of A is vA
and that of B is vB , the value of vA/vB is

A 1/2

B $\frac{1}{\sqrt{3}}$

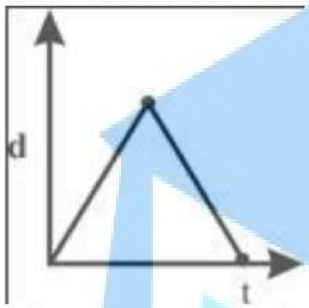
C $\sqrt{3}$

D 1/3

Explanation

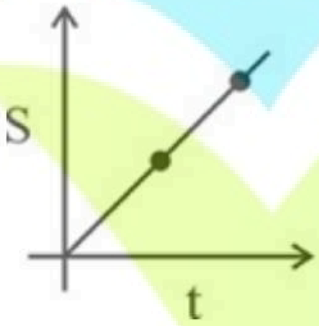
$= tan60^\circ \therefore \frac{V_A}{V_B} = \frac{\tan 30^\circ}{\tan 60^\circ} = \frac{1/\sqrt{3}}{\sqrt{3}} = \frac{1}{3}$

Q : To convert given displacement-time graph into distance time graph,

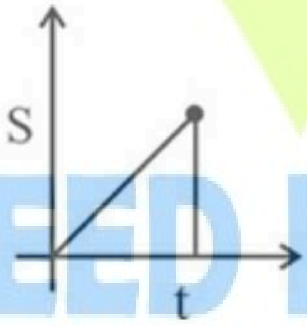


The corresponding distance time graph will be

A



B



C

Correct Unattempted

Incorrect Q 12/30

Q : The slope of the tangent of a point on d-t graph gives the magnitude of

A uniform velocity

B Instantaneous velocity

C average velocity

D constant velocity

Correct Unattempted

Incorrect Q 13/30

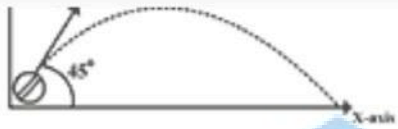
Q :
If d-t curve is a straight line, it shows that body is

A average velocity

B uniform velocity

C both '(a)' and '(b)'

D instantaneous velocity



A 0J

B 100J

C 25J

D 50J

Explanation

$$K.E = K.E_{max}\cos^2\theta$$
$$= K.E_{max}\left(\frac{1}{\sqrt{2}}\right)^2$$
$$= 100 \times \frac{1}{2}$$
$$= 50J$$

Incorrect Q 15/30

Q :
At which point for a projectile its kinetic energy is completely converted into potential energy

A At point of projection

B At the highest point

C Point to hit the ground

D Not possible

Explanation

There is no point in the path of a projectile where K.E is completely converted to P.E every point have some amount of K.E and P.E.

Q :
A 1000-kg airplane moves in straight flight at constant speed. The force of air friction is 1800 N. The net force on the plane is:

A Zero

B 11800 N

C 1800 N

D 9800 N

Explanation

$v = constant \Rightarrow \Delta v = 0$

$a_{net} = 0 \Rightarrow F_{net} = 0$

$v = constant \Rightarrow \Delta v = 0$

$a_{net} = 0 \Rightarrow F_{net} = 0$

departure to arrival along vertical direction, is

A 2mv

B $\sqrt{2}mv$

C mv

D $\frac{mv}{\sqrt{2}}$

Explanation

Change in momentum is the product of force and time

$$\Delta p = mg \times \frac{2v\sin\theta}{g}$$

$$= 2mv\sin\theta$$

$$= 2mv\sin 45° = \frac{2mv}{\sqrt{2}} = \sqrt{2}\,mv$$

Correct Unattempted

Incorrect Q 18/30

Q : A ball is projected horizontally from the top of a cliff on the surface of the earth with a speed of 40ms-1. Assuming that there is no air resistance, what will its speed be 3 s later?

A 30ms-1

B 40ms-1

C 50ms-

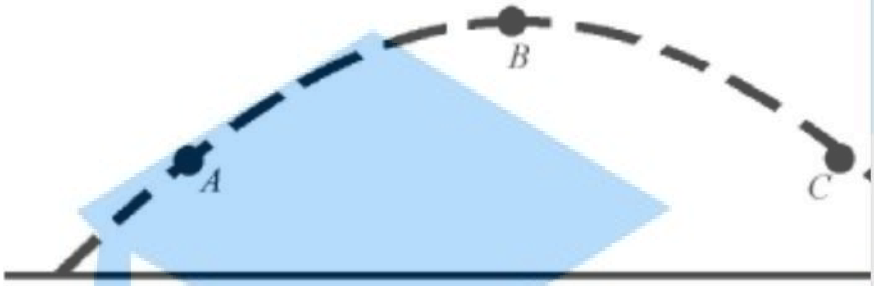
D 60ms-1

Explanation

$$v = \sqrt{v_x^2 + g^2t^2} = \sqrt{(40)^2 + (10)^2(3)^2}$$

$$v = \sqrt{1600 + 900} = \sqrt{2500} = 5ms^{-1}$$

points A and C are at the same height



Which of the following best describes the direction of the velocity of the cannonball at point B?

A to the right

B down and to the right

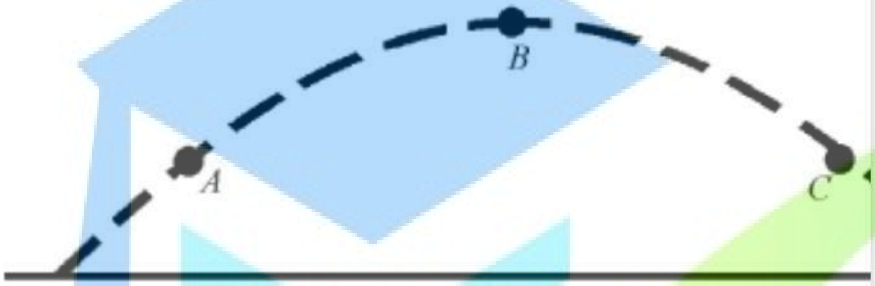
C up and to the right

D up

Explanation

at highest point only horizontal velocity acts which having direction horizontally towards right according to given diagram

cannonball is fired and follows the parabolic path shown below. Air resistance is negligible. Point B is the highest point on the path and points A and C are at the same height.



How do the accelerations of the ball at the three points compare?

A $a_A < a_B < a_C$

B $a_B < a_A < a_C$

C $a_A = a_B = a_C$

D $a_A = a_B < a_C$

Explanation

ay in projectile motion at every point is equal to g which has direction directed towards downwad.

Correct Unattempted

Incorrect Q 21/30

Q : Two balls projected at 30o and 60o with same initial velocities. The ratio of their maximum heights is:

A 1:2

B 1:4

C 1:3

D $1:\sqrt{2}$

Explanation

As

$$H_{max} = \frac{v_i^2 \sin^2\theta}{2g}, \text{ As } v_i \text{ is same so } \frac{H_1}{H_2} = \frac{\sin^2}{\sin^2}$$

Correct Unattempted

Incorrect Q 21/30

Q : Two balls projected at 30o and 60o with same initial velocities. The ratio of their maximum heights is:

A 1:2

B 1:4

C 1:3

D $1:\sqrt{2}$

Explanation

s v_i *is same so* $\frac{H_1}{H_2} = \frac{\sin^2\theta_1}{\sin^2\theta_2} = \frac{(\sin 30)^2}{(\sin 60)^2} = 1:3$

Correct Unattempted

Incorrect Q 22/30

Q : A projectile is projected with kinetic energy (K.E). If it has the maximum possible horizontal range, then its kinetic energy at the highest point will be:

A K.E

B 0.75 K.E

C 0.5 K.E

D 0.25 K.E

Explanation

$$K.E_H = K.E_1 \cos^2\theta$$
$$K.E_H = K.E_1 \cos^2 45° = 0.5K.eE$$

Correct Unattempted

Incorrect Q 23/30

Q : A body is thrown with a velocity of 9.8 m/s making an angle of 30o with the horizontal. It will hit the ground after a time

A 1 sec

B 2 sec

C 3 sec

D 1.5 sec

Explanation

$$t = \frac{2v_i^2 \sin\theta}{g} = \frac{2(9.8)\sin 30}{(9.8)} = 1\,\text{sec}$$

Incorrect

24/30

Q :
Time of flight of projectile is

A $\frac{v_i \sin\theta}{g}$

B $\frac{v_i^{\,2} \sin\theta}{g}$

C $\frac{2v_i \sin^2\theta}{g}$

D $\frac{2v_i \sin\theta}{g}$

Explanation

$\frac{2v_i \sin\theta}{g}$ is the time of flight of projectile.

Correct Unattempted

Incorrect 25/30

Q : The maximum range of a projectile fired with some initial velocity is found to be 1000 m in the absence of wind and air resistance. The maximum height reached by the projectile is

A 250m

B 500 m

C 1000m

D 5000m

Explanation

$R\tan\theta = 4H$

$\theta = 45°$

$H = \frac{R}{4} = \frac{1000}{4} = 250\,m$

Correct Unattempted

Incorrect Q 26/30

Q :
At which pair of angles the range of projectile would be same

A $30^o, 60^o$

B $25^o, 65^o$

C $15^o, 75^o$

D all of these

Explanation

$\theta_1 + \theta_2 = 90°$

$R\theta_1 = R\theta_2$

Correct Unattempted

Incorrect Q 27/30

Q : Four projectiles are fired with the same velocity at angle, 25°, 40°, 55° and 70° with the horizontal. The range of projectile will be largest for the one projected at angle

A 70°

B 40°

C 55°

D 25°

Explanation

Range will be maximum at that angle which is nearest to 45

Correct Unattempted

Incorrect Q 28/30

Q :
Air resistance decreases the

A horizontal component of velocity of a projectile

B vertical component of velocity of a projectile

C vertical component of acceleration of a projectile

D none of these

Incorrect

Q 29/30

Q :
When air resistance acts, acceleration during a fall will be

A greater than g

B less than g

C equal to g

D none of these

Explanation

acceleration during a fall will be less than g because air resistance affects the motion of the falling objects by slowing it down

Class Test-1 (Unit # 1)

Correct Unattempted

Incorrect Q 30/30

Q : The Factors affecting the flight path of a Projectile from the following are

A Air Resistance

B Gravity.

C Angle of Release

D All of these

Explanation

all factors given are responsible for the flight of projectile